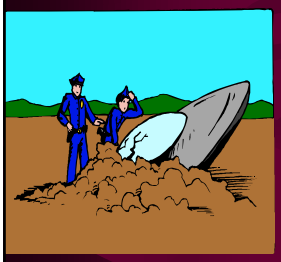
Characterizing the Nature and Extent of Contamination

Planning The Investigation

- May Be a Continuation of Previous Activities Or the Beginning
- Identify Potential Contaminants
- Select a Sampling Strategy
- Determine Potential Human or Ecological Receptors

Conduct the Field Investigation



- Define the Horizontal and Vertical Extent of Contamination
- Determine the Soil pH
- Evaluate Background When Needed
- Evaluate the Migration and Transformation of Contaminants

Sampling Methodologies

- Statistical Sampling
  - Often Used When There Is Little Information Available
  - May Require Large Sample Numbers In Some Situations
  - There Are Variations In Method To Reduce the Sample Number But Maintain Quality
- Judgemental Sampling
  - Often Used When There Is Lots Of Information
  - You Can Not Perform Statistical Calculations With Judgemental Samples
  - The Sample Number Can Be Large In some Cases

Field Investigation

- N&E Can Have Many Purposes
  - Calculate a Source Area Average
  - Find the Boundaries of Contamination
  - Identify Areas For Remediation
  - Determine the Significance of Screening Evaluations
  - Evaluate Ecological Impacts
  - Identify Potential Receptors

Field Investigation

- Soils - Horizontally to Residential Closure Levels and Vertically to the Land Use Specific Closure Level With a Ground Water Sample
- Ground Water - Horizontally to the Residential Closure Level
- For Ground Water the Need For Vertical Characterization Depends On the Nature of the Contaminant

Field Investigation

- There Are Exceptions to the Rules on Extent of Characterization
  - Complex Sites With Many Source Areas - Characterize Soils to Industrial Closure Levels and Perform Fence Line Evaluation
  - Ground Water Samples May Not Be Needed If - Two Consecutive Clean Soil Increments - or - Extremely Deep Ground Water

Minimum Required Number of Borings

- 1/2 Acre - 10 For Concentration Gradient and 4 to Define Boundaries
- 1/4 Acre - 5 For Concentration Gradient and 4 to Define Boundaries
- 1/10 Acre - 3 For Concentration Gradient and 4 to Define Boundaries
- This Is the Default Minimum. More or Fewer May Be Required On a Site Specific Basis In Nondefault

Ground Water Characterization

- For Screening and N&E Push Probes Are Generally Acceptable
- For Time Series Monitoring, Permanent Wells Are Required
- In General, RISC Requires No Change In Ground Water Characterization Procedures
- The Perimeter of Compliance Is Located At the Land Use Specific Closure Level
  - Exception - Property Line If No Access

Ground Water Characterization

- There Can Be No Receptors Inside the POC
- No Further Degradation
- Free Product Recovery
- No Impact On Susceptible Areas
- Present and Future Land Use Must Be Considered
- Off-Site POC Acceptable if There Is Property Control

Investigating Other Media

- Surface Water
  - Includes Wetlands and Free Flowing Underground Streams
- Sediments
  - Contamination Can Affect Aquatic Organisms and Plants
  - Bioaccumulation May be a Problem

Investigating Other Media

Air

- Ambient Air
  - Emissions From Industrial Sources
- Indoor Air
  - Volatilization From Ground Water
- Fugitive Dust
  - Unpaved Roads and Parking Lots

Data Validation and Usability

- Data Must Be Evaluated For Conformity to DQOs
- Additional Data Collection May Be Necessary
- If the Data Is Inadequate or Low Quality, the N&E Evaluation May Be Meaningless